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WAR AND THE FOOD SUPPLY IN EUROPE.

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CONTINUED prosecution of war by an isolated nation depends ultimately upon what that nation can produce. Many things are needed: metals, fuel, animals for draft, feed for animals, men and food. Food not only for those at the front but for the great armies of non-combatants. The present situation in Europe has led to inquiries into the abilities of the countries involved in war to support themselves. For Germany and Austria-Hungary in particular this is a matter of extreme moment. Their central location and undemonstrated naval strength cuts them off from any important over-sea food supply.

The great expansion of industrial and commercial interests in recent decades has created in most European countries a basis for populations much in excess of those which exist in the same countries under purely agricultural conditions. Of the countries at war Belgium and England have the largest proportion of industrial population. Germany and France also rank high in this respect while Hungary and Russia still are dominantly agricultural. In the latter country about 85 per cent of the total population live in rural communities.

So far as the human population of Europe is concerned, among the least dispensable food products are wheat, rye, potatoes, pork, and beef. Other grains and other animals are of no less importance but to consider them would require a study of greater length than is here possible. In normal times the areas in which these staples are produced are distributed in accordance with the workings of certain economic and geographic forces such as the distance and size of markets, value of land, difficulty of transportation, nature of climate or quality of soil. Of these conditions not the least are geographic.

Wheat is native to the sunny lands of the Mediterranean region and in western Europe is to be found chiefly in the dryer parts of England and France where the glacial, alluvial and residual soils are of high fertility. Figure 1, based on statistics of area, somewhat exaggerates the wheat production of Russia as against that of western Europe. The low rainfall and rich, black earth of southern Russia make it a region admirably suited to wheat culture and the area sown is large, but poor agricultural methods give a low yield. France with its small area ranks third in the world's production of this cereal. Germany is not an important wheat producer, partly due no doubt to national prejudice but also to summers with lower temperature and higher humidity and to a soil in many places too light for wheat culture.

Rye furnishes the chief bread-stuff of Germany and in fact of the peasants

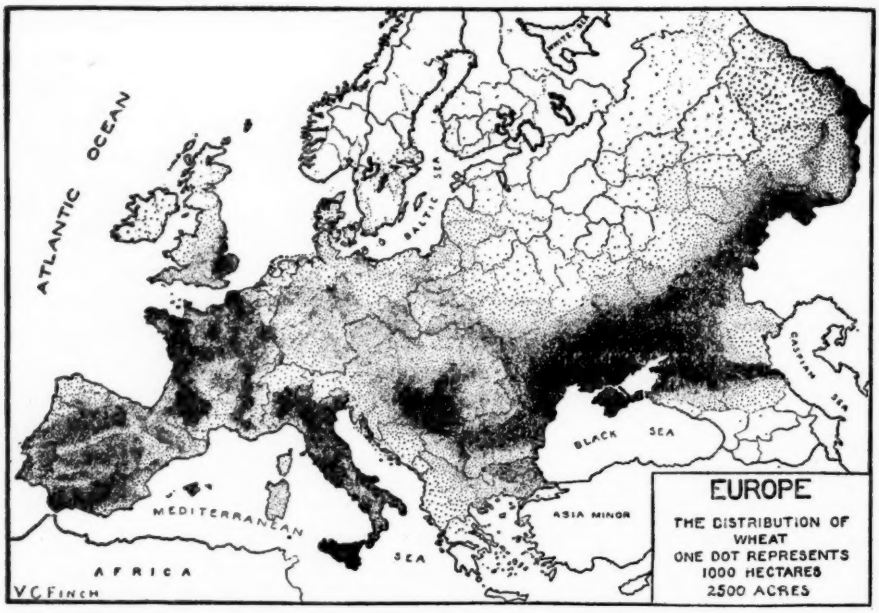

Fig. 1. The distribution of wheat in Europe reflects the distribution of sunny climates and rich level lands. There are exceptions to both.

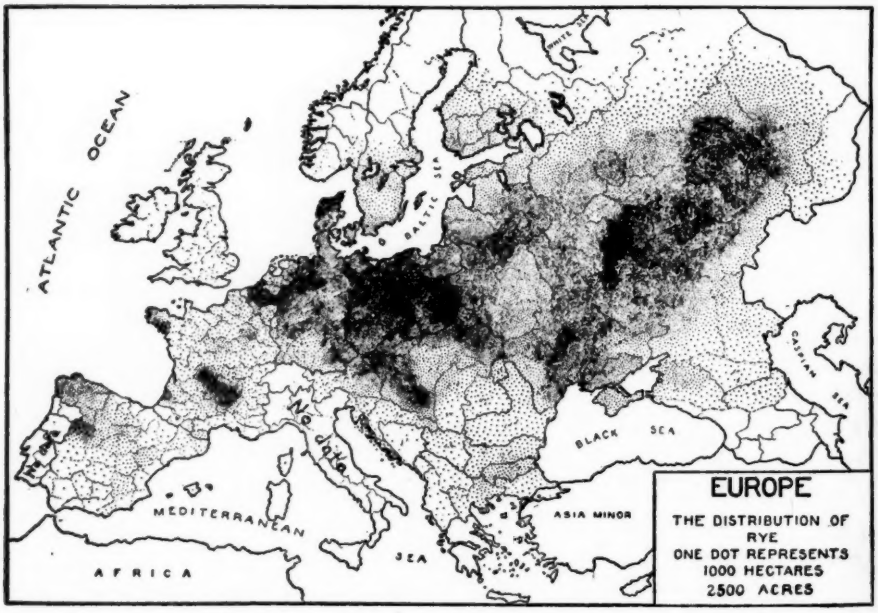

Fig. 2. The distribution of rye in Europe is almost perfectly complementary to that of wheat. It is found in the colder regions, the poorer soils or rougher topography.

[These five maps appeared in the *American Review of Reviews*, November, 1914].

of Russia. In nutritive value it is not inferior to wheat and it has the advantage of giving a better yield on poorer soil and in less favorable climates. Thus it is much grown on the sandy plain of north Germany, the hilly regions of central and south Germany and the cooler and moister central Russia (Fig. 2). The crop of Russia exceeds that of Germany and Austria-Hungary combined. In France rye reaches an important acreage only in the Auvergne Plateau, the poverty spot of the country.

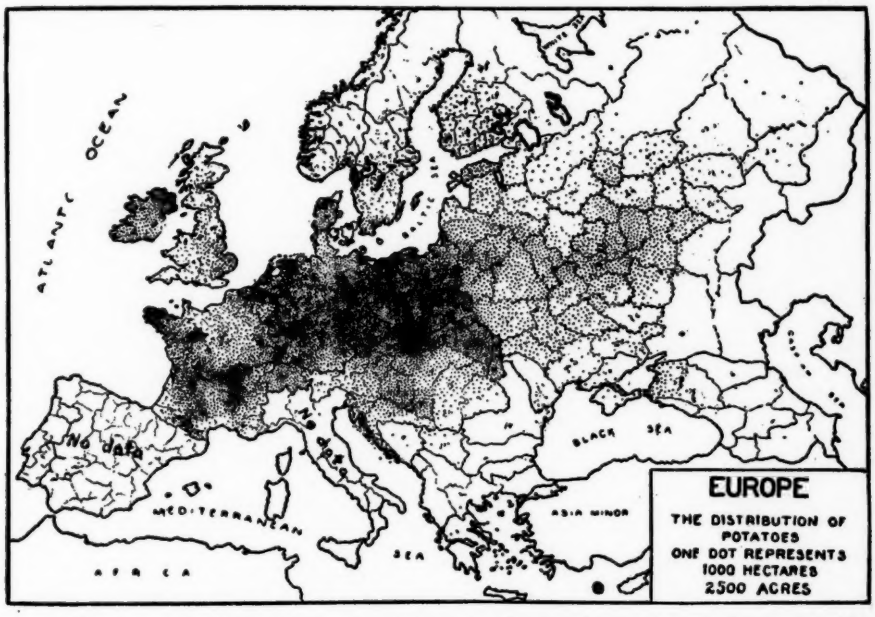

Fig. 3. The distribution of potatoes in Europe is greatly in favor of Germany and Austria. Even Ireland is but a small competitor. Geographic conditions only partly explain it.

The importance of the rye crop in European economy is often underestimated in America. In the five years from 1895 to 1899, rye formed 49 per cent and wheat 51 per cent of the combined crop of these cereals in Europe. Of the world's crop of wheat in this time Europe produced only 55.5 per cent, of the world's crop of rye 94.1 per cent (*U. S. Dept. of Agriculture, Year Book,* 1900, page 167).

Whether the supply of these grains in Germany is sufficient to meet the local need is a problem much argued both inside and outside that country. Count von Moltke is inclined to an optimistic view, citing as evidence the fact that Germany has of recent years lessened her import of bread-stuffs. Dr. Ballod, a German economist, in differing with him (*Literary Digest,* October 17, 1914) supports his position with the assertion that fifteen years ago it might have been possible for Germany to subsist upon cereals produced within her own borders but that today it is no longer so because the absence of im-

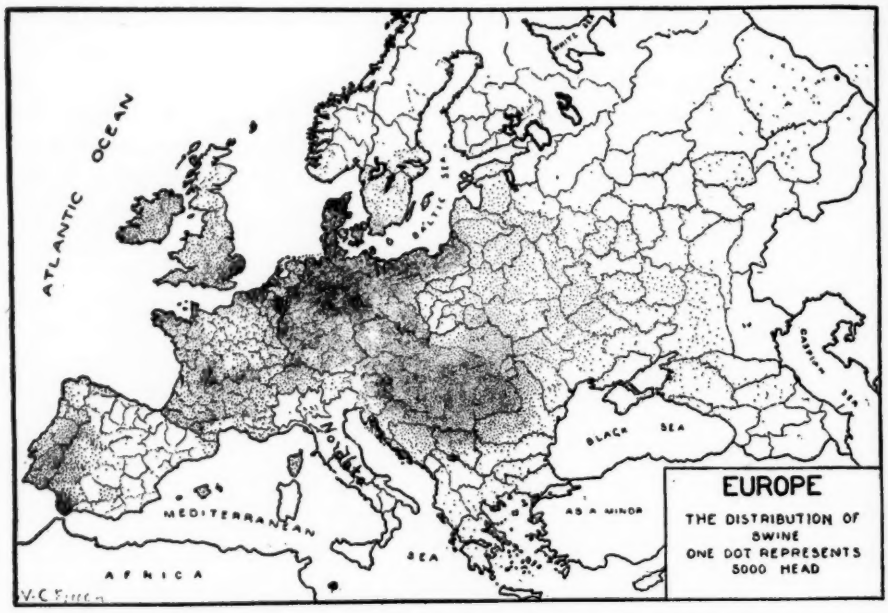

Fig. 4. The distribution of swine in Europe is partly explained by the potatoes of Germany, the corn of Hungary and France and the oak forests of France, Spain and Portugal.

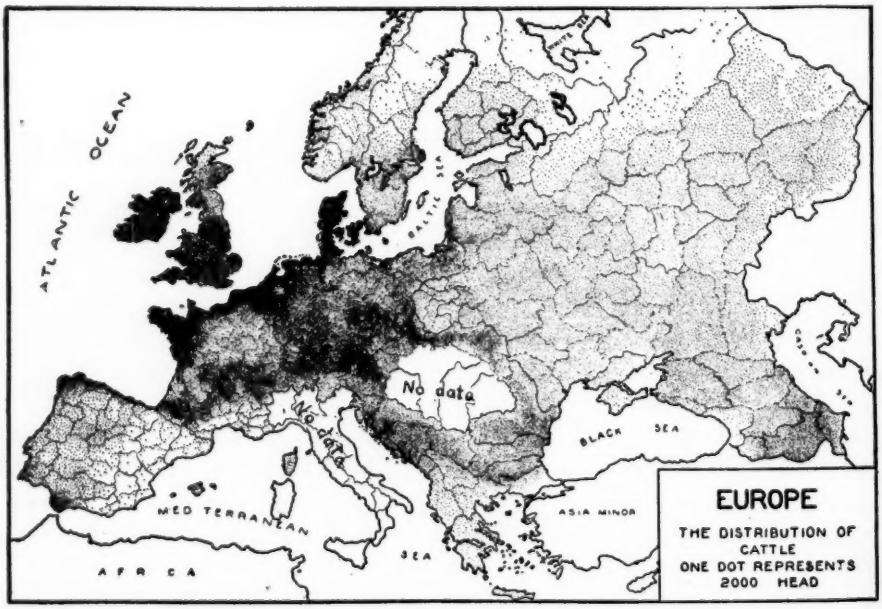

Fig. 5. The distribution of cattle in Europe is largely a question of pasture. Their relative absence from the Mediterranean coasts with their dry summers is especially to be noted.

ported feed for cattle will seriously interfere with beef, milk, and pork production and bring a larger demand upon the local grain supply for food, larger in all probability than can be met. Prof. F. Wohltmann of Halle, Germany, believes that areas of production of foodstuffs can be increased and additional supplies drawn from Roumania, Belgium, and other areas outside, so that Germany is not in danger of being starved out.—(*Deutsche Tageszeitung,* Sept. 22, 1914). Some of these sources of supply seem decidedly doubtful. Indications are that the cereal crop of Germany is normal this year and that there was ample labor to harvest it.

Potatoes are Germany's most important hoed crop, occupying 12 per cent of the total cultivated area, while all other hoed crops together cover only 4 per cent. The 8½ million acres devoted to the crop is more than double that in the United States and the harvest of 40 million tons more than four times our total. (*Mo. Bull. Agric. Intelligence and Plant Diseases,* Sept., 1913). (*U. S. Dept. Agric. Bull.* 47). Of this immense crop about 13 million tons are used for human food, 16 millions for cattle feed, 2½ millions for distilling and ½ million for drying. Of these dried potatoes a flour is made which may to some extent supplement wheat and rye flour. The per capita consumption of potatoes in Germany is 7.3 bu. per year. In the United States it is about 2.6 bu. (The 1914 potato crop in Germany is reported to be about 80 million tons, double the above average figure).

It is fortunate for Germany's meat supply that the economic pressure of growing industrialism has during past decades caused a great decline in the sheep industry with a corresponding increase in the production of swine. The omnivorous tastes of this animal combined with the shortness of the period in which it attains a marketable size and the excellence of pork products for food are decidedly in favor of its production at this time (Fig. 4). The most recent census shows Germany to be capable of producing about 8 million beef animals, 5 million sheep and 26 million hogs per year. (*Dernburg*: *Am. Review of Reviews,* Nov., 1914).

As concerns the supply of beef and milk-producing cattle Germany seems to be at a disadvantage. Cattle in Europe depend much upon pastures. The mild humid coastlands of France, Belgium, Holland and Denmark show the greatest cattle concentration (Fig. 5). Ireland also is an important storehouse of cattle for England. These supplies however would not suffice if importations were stopped. Germany is certainly not better off and importation for her is impossible. If a meat supply is to be developed within her borders, it will doubtless be through hog-raising. Germany now leads Europe in the magnitude of this branch of animal industry. Moreover, pork has the advantage of maturing in one year instead of two or three and of making growth on a wider range of feed products than cattle. It is feared, however, that grain shortage will curtail all forms of animal industry.

THE GEOGRAPHICAL CONDITIONS OF NATIONAL DEFENSE.

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CENTRAL Europe is full, at the present day,* of a rich and civilised life. It has blossomed in the sunshine of peace, and only under this star can go on prospering undisturbed. But a love of peace on the part of the populations who inhabit it is not all that is necessary. Central Europe has been the battlefield of foreign peoples, the object and the prey of conquering neighbours, and can never forget that constant thought and constant labour are necessary in order to be ever ready in defence of its soil and its industry. There is no other part of Europe whose position, in case a fresh military period were to set the world in flames, would be so much threatened as would that of Central Europe. Who can dare to say that such dangers as were undergone by Ferdinand the Second and Frederick the Second may not once more befall the powers of Central Europe? Would they be strong enough if the cry "Enemies all around" were once more to compel them to lay their hands to the sword? In answering this serious question geographical facts take a decisive part, and invite us to survey the means of defence along the frontiers.

The western border of Central Europe is that which has undergone most variation during recent centuries, and has been the subject of most recent conflict. Here, even in the present day, is the most serious point of tension. In opposition to the French efforts at expansion, which at one time succeeded in setting back this frontier as far as the Baltic, the European Powers took measures, at the Congress of Vienna in 1815, to protect Germany, which, owing to its divisions, was at that time weaker than it is now. Switzerland and the kingdom of the United Netherlands were created as buffer states. The neutrality secured to these was also promised in 1832 to the newly formed kingdom of Belgium. The value of this protection on both flanks of the western frontier of Germany does not depend solely upon the security of international agreement and the doubtful readiness of the guarantors to protect this neutrality by force of arms. The neutral states themselves have shown, by the measures of self-defence which they have undertaken, that they are not disposed to let themselves be involved without resistance in the quarrels of their neighbours. It remains, however, somewhat uncertain whether they would have resolution

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*** The following extract from Chapter XX of Partsch's book on *Central Europe* was written in 1899, first appearing in English in 1903—in Appleton's *World Series, The Regions of the World*, edited by H. J. Mackinder. It is reprinted here because of especial interest in connection with the war in Europe.**

Central Europe, as treated in masterly fashion by Partsch, includes Germany and Austria-Hungary, with Belgium, Netherlands, and Switzerland on the west and Roumania, Bulgaria, Servia, and Montenegro on the southeast. Certain paragraphs referring to these smaller countries except Belgium and Netherlands are here omitted.

enough to throw their defensive power quickly and emphatically into the balance against the invader of their neutrality.

This is all the more doubtful, because the temptation not to respect neutral territory only arises when a strong militant power has already obtained considerable advantages and its superiority begins to be decisive. As long as both adversaries face each other in the fulness of their power, neither could venture, unpunished, to turn the flank of the other by crossing a narrow strip of neighbouring neutral country. But when the strength of the two parties begins to be unequal, the stronger may attempt by thus reaching across to hasten the final decision, and to protect itself against reverses. In any case, it is obvious that Germany could never have anything to gain by taking this course. Aix-la-Chapelle lies 264 miles distant from Paris and Metz 200 miles, and the way through the fortresses of the Sambre to Paris is not easier for a German attacking army than that by way of Verdun. Nor could a march through Switzerland give any greater advantage to German troops. Why should they expose themselves to the difficulties and dangers of crossing the Swiss Rhine country and the Jura, when beyond these great obstacles they would still find themselves confronted by the same French fortifications that directly touch German territory at the gate of Belfort? Nor could an alliance with Italy ever lead Germany into the error of taking an army to be useless in the blind alley of Switzerland, shut in by the Jura. It would be madness to purchase a co-operation with Italy on Swiss ground by an invasion of Switzerland, for an expedition north of the Alps would demand far greater powers than Italy could ever spare from her home defences.

With France the case is different. If the defensive power of Germany should be diminished along the Rhine, either by reverses or by the requirements of some war at a distance, France might hope, by advancing through Belgium, to enter Germany at the less protected northern end of the west frontier, to combine operations with its own navy, and in case of a simultaneous attack from Russia, to strike the severest blow at the enemy, who would lie between two hostile forces. Or if the German army of the Rhine were weakened and obliged to confine itself to defending the fortifications, the advance of a French army through North Switzerland into the heart of South Germany might be even more tempting. These are the possibilities which the neutral states have seriously to keep in mind in the preparations for the defence of their neutrality. The defensive preparations of Switzerland, at any rate, seem to be guided by quite other views, and to propose a resistance in the inmost parts of the territory. . . . The whole salvation of Switzerland would depend upon its making a firm stand for the complete inviolability of its territory.

While that country has natural defences against the foreign invader in its mountains, its rapid and abundant rivers, and its broad lakes, the natural position of Belgium is not so secure. Its territory is intersected by the mili-

tary road along the Sambre and the Meuse that has been used in so many wars. In any conflict between the two adjoining powers, the shortest line between the objectives of the operations on both sides, Paris and Berlin, would pass along it, and would lead through rich highly cultivated country, offering relatively little natural hindrance. It is, therefore, of extreme importance that Belgium has not, like Switzerland, contented itself with preparing a refuge for its military power, as far as possible from the border, but has closed the line of the Meuse at the very frontier by the great fortified places of Liège and Namur, which bar the way against both Powers. The chief strength of Belgium would not, however, be stationed here, but would be collected in a great fortress lying aside from this line—Antwerp. This position offers the advantage of being protected on the south by the line of water formed by the union of the rivers Nethe, Rupel, and Scheldt. Beyond these rivers, the most important crossing-places of which are fortified, lies the circle, nine miles in diameter, of Antwerp's fourteen new forts, which have quite altered the character of an old fortified place that used to depend upon a ring of waters. The forts are especially strong towards the sea. It is obvious that the choice of this spot—which indeed is by nature well adapted for defence—has been in part decided by the hope of help from without. And indeed England's policy could never suffer any of the great Continental Powers to gain a firm foothold exactly opposite to the Thames, and, as Pitt expressed it, "to hold a pistol to England's breast."

The example of this strong fortification of the environs of Antwerp may have contributed to make Holland prepare its national defences with so much insight and caution. As in former centuries, the strength of Holland still lies in the great expanse of country that can be flooded. This protection is only lost in very severe winters, such as that of 1794-95. The "new water-line" from the Zuyder Zee to the Lek, protected by Utrecht and a number of smaller fortifications, is, together with its continuation to the junction of the Meuse and Waal, Holland's principal line of defence towards the east; while, on the south, rivers that widen into real arms of the sea forbid any hostile approach. Safely sheltered behind this protected belt of waters lies the principal fortress of the country, Amsterdam, surrounded by a wide ring of forts and a territory within its own power to inundate. The surrounding defences are completed by the fort of Ijmuiden at the entrance to the North Sea Canal, and by the forts around Helder, which close not only the entrance to the North Holland Canal but also that to the Zuyder Zee, and so prevent the passage towards Amsterdam of hostile ships or of materials for a siege.

The peaceful dispositions and the good state of defence of its three neighbours on the west are of great importance to Germany in the task of defending its 150 miles of frontier against France. The acquisitions of the last great war, which restored the losses of centuries, altered the conditions of national defence fundamentally and to the advantage of Germany. Whereas

the former frontier used to be the Rhine, which served to conceal the military preparations of France, and whereas the fortress of Strassburg used to be a direct menace to the safety of South Germany, the river, from Basle to the frontier of Holland, is now once more entirely in the hands of the Germans. If there were danger of war, the line of the Rhine would cover the strategic advance of the German forces. Between Basle and Mayence the river is crossed upon German territory by eleven railway bridges and sixteen pontoon bridges. Beyond the river, Upper Alsace is covered by the broad and wooded mountains of the Vosges; and where these mountains end, and the Saar basin is bordered by low hills, eight lines of railway run from the reach of the Rhine between Strassburg and Cologne towards the westward projection of the frontier of Lorraine. The newly acquired line of the Moselle is here protected by the mighty fortress of Metz, the new forts of which form a circle round the town five miles in diameter, and more to the north, close to the frontier of Luxemburg, by Diedenhofen. It would be between Metz and the northern end of the Vosges, as a glance at the railway map will show us, in front of the Saar and behind the Seille, that the main defending force of Germany would probably collect. Military writers consider the fields round Lunéville and Nancy as the probable scene of the first decisive action in any future war. Its result would decide whether an advance upon the first French line of defence, supported by the Upper Moselle and Meuse and by the great fortress of Epinal, Toul, and Verdun, were possible for the German army, or whether the French could open their advance upon the Rhine towards the great places of Strassburg and Mayence.

If the neutrality of Belgium were to be violated by France, Cologne would become the central point of defence, and in the course of the last twenty or thirty years nothing has been spared to bring its fortifications into the best and most modern condition; the importance of Wesel, too, has not been forgotten. If an advance should be made through the Gate of Belfort and North Switzerland towards the interior of South Germany, the French would indeed find, if they avoided the fortified places of Breisach and Istein, that the whole reach of the Rhine which lies between Germany and Switzerland, from Basle up to Constance, is unprotected; but the modernised fortresses of Ulm and Ingolstadt would oppose a barrier, and even under great difficulties would secure time for the German military leaders to collect sufficient forces on the Danube, or to carry out serious operations against the enemy's communications.

Any attack upon the western frontier of Germany would probably, in the present preponderance of the French navy, be accompanied by a threatening of the German coasts. The experiences of the last war should not lead to the underestimation of this danger. In the North Sea, the shallows impede the approach of hostile vessels. Nothing, however, has been left undone in the defences of the naval station of Wilhelmshaven, and of the mouths of

the rivers Elbe and Weser. The acquisition of the Island of Heligoland is of ambiguous value. While this little rocky inlet remained in the hands of England, Germany might at any time have had the annoyance of seeing a hostile fleet collect there, but now that it is protected by German batteries it makes an outlying point open to the first attack. The mouth of the Elbe has become a more important place since it received the North Sea and Baltic Canal. The two extremities of the canal are not much exposed to danger; the more easterly lies in the middle of Kiel Harbour, and is covered by strong fortifications at its entrance. To protect its course through Holstein, if it were threatened by a force that had landed, say, in Jutland, would be more difficult.

The coasts of the Baltic, owing to their extent, are inconvenient to fortify, and are not so naturally difficult of approach as the shallows of the North Sea. The best protection here consists in a line of railway running along the coast, and ready to carry help to any point threatened. The important commercial inlets, however, are fortified, or else ready to be closed by torpedoes in case of war. Fortunately the large towns lie far back, out of danger of bombardment, a good way up the mouths of rivers, and in some cases at the end of broad haffs. Two of them, Danzig and Königsberg, are already among the strongest defensive positions along the eastern frontier.

If France were to conspire with the giant Empire of the east for the destruction of the German Empire, it would help to bring about its own ruin and the slavery of its future generations. The unlimited growth of the Russian Empire, and the disturbance of the balance of power in the interior of Europe to the advantage of Russia, which already contains more than a quarter of all the inhabitants of the Continent, do undoubtedly constitute a danger to the whole Germanic, and also to the whole Latin world. The danger is but little lessened by the consideration that there are no grave interests in dispute between Russia and Germany. While it is certain that Germany will never covet a square mile of Russian soil, no one can answer for it that the Russian Colossus, in its unceasing expansion, may not some day attempt once more to push its western frontier forward. No natural barriers, difficult to cross, protect Germany on the east. Only the power of the German people to defend itself can protect this boundary.

The task is rendered more difficult by the length and its retreating curve to the westward. The frontier measures 750 miles from Memel to the Three-Emperors Corner at Myslowitz, and while the direct line from the eastern ends of East Prussia and Silesia passes through Warsaw, the Russian territory on the Middle Warta pushes so far westward that Berlin stands at a distance of only 180 miles from the frontier. This wedge of Poland points menacingly towards the German capital, and leaves the military strength of Russia free to choose upon what part of the long frontier line it will direct the full force of its onset. East Prussia, surrounded on the south, east, and north by Russian territory, exposed on the north-west to the attack of the Rus-

sian Baltic fleet, is connected with the main body of the Empire only by a length of 75 miles and lies in the greatest danger. The first effort of any Russian attack would be to paralyse this wing of the Prussian eagle. If the armies of Germany were compelled to act on the defensive here, they would find their task lightened only along the southern border, where there are woods and the tangled waters of Masuria. Between the long lakes with their many arms, the roads have to go across narrow passages which would be easy to defend, even if the closing of them had not been prepared in time of peace, by building little forts like Fort Boyen at Lötzen. For great hostile undertakings this tract of country is in any case less suitable. The natural lines of Russian advance are the broad valleys of the Pregel and the Vistula. The Russian railway system has prepared, in the junctions of Vilna and Warsaw, points of departure for both these lines of attack. The fortifications of Kovno, at the crossing of the Niemen, form a base from which an army which was not opposed by an equal force would find the way open through the Pregel district as far as Königsberg. A wide ring of forts has of late years made this place into a fortress of the first rank, which cannot be fully surrounded so long as the Frische Haff with its fortified entrance, the Pillauer Deep, are not in the enemy's hands. With Königsberg as a base, a lesser Prussian army might maintain its footing upon the island of the coast between the Haffs and the mouths of the Pregel, whose branches fall into them; or, stationed behind the Deime and the Alle, such an army could protect all East Prussia. Its situation would only be seriously endangered if a Russian army from the Vistula were to gain a decisive success, and to cut East Prussia's communications on the west. The strong fortifications on the line of the Vistula have been erected to meet this danger. Thorn, in particular, has a large ring of detached forts commanding both banks of the river, and able with an energetic and active garrison to extend their influence north-eastward, as far as the Prussian lake country, and south-westward as far as the lakes of the Upper Netze. Only 30 miles further to the north lies Graudenz at the head of an important bridge, which has recently been strongly fortified, and lies half-way between Thorn and the delta of the Vistula. The area of the delta ready for inundation strengthens the position of Dantzig, which the forts on the western hills and at the mouths of the river have made into a spot most capable of being defended. It is connected with Königsberg on one side by the Frische Haff.

With the great military strength which Russia has at command, it would undoubtedly be possible that, simultaneously with an invasion along the Pregel and Vistula, an advance should be attempted towards Berlin. The advancing army on the left bank of the Vistula would be threatened on the flank by Thorn, and could not go on until it had completely invested this fortress; but if it did succeed in reaching the eastern border of the province of Posen, it would come into a country much cut up by long lakes running from north to south and offering many positions favourable to the defence. Beyond lies the reach of the Warta that runs northward, and upon it the strong fort-

ress of Posen. Here the lines of communication from all the eastern portions of the Empire converge. An interruption of these communications, by the surrounding of Posen, would be a heavy blow which the German military leaders would have to use every exertion to prevent. The wide ring of forts and the modern methods of construction give to Posen a great power of resistance to a siege, the materials for which would have to be brought from a great distance and by very difficult roads. Taken together, Königsberg, Dantzig, Thorn, and Posen form a ring of fortresses that enclose a natural division of territory and greatly enhance its powers of defence. The line of the Oder is of but secondary importance. Since the razing of the defences of Stettin, it has possessed but one strong fortress, Cüstrin, which has outlying forts, and stands at the embouchure of the Warta in a considerable area of easily flooded country. South of the Obra Bruch, which connects the Warta and the Oder, and bounds the sphere of influence belonging to the fortress of Posen, lies but one fortified place, at the head of a bridge, Glogau. Silesia is less important for the purpose of protecting the eastern frontier. It does not lie in the natural line of a Russian advance, and is in some degree defended by the far projection eastward of the Austrian Empire.

The whole conditions of national defence along this eastern frontier, with its unfavourable peculiarities, suggest that this border cannot be satisfactorily held on the defensive, and that serious injury can only be averted by a vigorous offensive. In the eastern provinces where no river runs, like the Rhine, parallel with the frontier, making a basis of defence, the place of some such basis would have to be supplied artificially by railway lines running along the border. The carefully laid out system of communications has everywhere created two, and sometimes for long distances three, independent lines of railway running parallel with the frontier, and these—if satisfactorily secured against destructive attacks by bodies of Russian cavalry—would render possible a rapid displacement of troops. They can, however, only be so guarded by a considerable advance of German troops. As the different size of the areas to be covered and the differences in railway development in the two empires would undoubtedly assure to the Germans the advantage of being more quickly ready for battle, it is obvious that Russia must reckon, in case of war, upon taking up at first a purely defensive attitude. She has prepared for it by constructing the square of Polish fortresses—Novo Georgiewsk, Ivangorod, Brest-Litewski, and Goniondz—which will enable her to collect her forces behind the great river frontage of the Bobr, Narew, Bug, and Vistula, and there to await with confidence the approach of any attack. Warsaw has also been made into a stronghold.

This conception of the position depends upon the paucity of railways, economically so much required in the great district on the left bank of the Vistula. Russia trusts for protection, even in this first stage of a war, to her superfluity of space, and to that "fifth element" which Napoleon discovered

with terror—the unfathomable mud of the roadway, which paralyses the most active strategy and tires the most valorous soldiers. The offensive side of national defence therefore presents serious difficulties to Germany. But the rich cultivation and increased population of Poland have in the course of a century changed the character of the battlefields, and deprived Russia of the exceptional position which she appeared to occupy after the experiences of Napoleon. The Russian Empire cannot be regarded as so invulnerable and so unapproachable for hostile troops at the present day as it was in 1812. The method of defence which was possible then cannot be repeated.

Calm and expert judges are inclined not to overestimate the danger of a war with Russia. Much would of course depend upon whether Germany had to bear all the weight of it alone, or whether it could reckon on the aid of its present ally, Austria-Hungary. The position of that power in regard to Russia is essentially different. The greater part of the Empire is sheltered by the Carpathians. Only Silesia, Galicia, and the Bukovina stretch down into the plain of Eastern Europe, and absolutely demand an armed defence against their great neighbour. Three railways lead from Moravia and five from Hungary into the district where the Oder rises, and into the basins of the Vistula and Dniester. Of these railways, six debouch into the valleys of the Vistula and San, behind which the principal defensive force would have to assemble, supported by the two great fortresses of Cracow and Przemysl, which are connected by two independent lines. Use could also be made of the lines in the valleys of the Waag and the Hernad, deep in the mountains, if troops had to be carried from one side to the other. The choice of two points of concentration at only 150 miles apart bears witness clearly enough of the conviction that a strip of land so long, and at the ends so narrow, as the outer border of the Carpathians from Teschen to Czernowitz (400 miles) can only be defended by forces held well together, and ready to take the offensive. The attraction of the enemy by a strong army serves better than a dispersion of forces to secure districts that lie at a distance. While the army of Cracow in a well-chosen position would face towards the Polish seat of war, and at the same time be ready, in case of an alliance, for co-operation with the German forces, the army of Przemysl and Lemberg would be required to advance towards Volhynia and Little Russia. In consequence of the division of the country into a northern and a southern field of operations, separated by the great marshy district of the Bug and the Pripet, this army would choose an independent aim, namely, Kiev. . . . . .

Although preparations are thus made for defence on the four faces of Central Europe and are continually perfected to meet the requirements of the times, we may, on the other hand, perceive in its interior a striking diminution of the friction between one state and another which was formerly so marked a defect. A general view of the defensive measures of Central Europe in the present day brings out, as at no previous time, the essential unity of this

great civilized region. Among all the alliances of our day, that between the two great Central European Powers is the most natural and has the strongest internal guarantees of permanence. If these two continue to hold together, not only will their smaller western neighbours be enabled, under the protection of their swords, still to enjoy prosperity and security, but the unruly peoples between the Adriatic and Black Seas will also learn to value and enjoy the blessings of peaceful industry. Central Europe has been the battlefield of all nations long enough to resist a recurrence of such sufferings with all its might and by a united movement of its millions of trained soldiers. May the great monument on the battlefield of Leipzig, where the criminal effort to enslave a whole continent was defeated, not by military skill, but by the elemental power of liberty-loving nations, remain the last memento of the political errors of previous centuries, a warning to all ambitious tyrants in the future, and an admonition to the peoples of Central Europe to remain united, to keep peace, and to command peace.

UNFAMILIAR NAMES IN THE GEOGRAPHY OF EUROPE.

Form used in parts of Europe.	*Nature and location of geographical feature.*	*Name usually used in America.*
Lüttich or Liuga	City in Belgium	Liege
Bruxelles	City in Belgium	Brussels
Anvers or Antwerpen	Largest port of Belgium	Antwerp
Escaut	River in Belgium and Holland	Schelde
Ryssel	City in France	Lille
Aachen	City in Germany	Aix-la-Chapelle
Elsass-Lothringen	Province in Germany	Alsace-Lorraine
Nord See or German Ocean	Sea east of British Isles	North Sea
La Manche or Der Kanal	Body of water between England and France	English Channel
Köln	City in Germany	Cologne
's Gravenhage or Haag	Capital of Netherlands	The Hague
Pays Bas	Country of Europe	Netherlands or Holland
Weichsel	River in Germany and Russia	Vistula
Wien	Capital of Austria-Hungary	Vienna
München	City in Germany	Munich
Schwartzwald	Mountain range in Germany	Black Forest
Gand or Gent	City in Belgium	Ghent

Form used in parts of Europe.	*Nature and location of geographical feature.*	*Name usually used in America.*
Trier	City in Germany	Treves
Mainz	City in Germany	Mayence
Vlissingen	City in Netherlands	Flushing
Maas	River in France, Belgium and Holland	Meuse
Waal, Lek, and Ijssel	Names of the distributaries of the Rhine River in Holland, the Waal being the main Rhine and going by the name Maas in western Holland.	
Diedenhofen	City in Germany	Thionville
Donau	River in Germany, Austria-Hungary, and Balkan States	Danube
Lwów	City in Galicia	Lemberg
Krakau	City in Austrian Poland	Cracow
Genf	City in Switzerland	Geneva
Braunschweig	City in Germany	Brunswick
Brügge	City in Belgium	Bruges
Kjöbenhavn	Capital of Denmark	Copenhagen
Lac Léman or Genfer See	Lake in Switzerland and France	Lake Geneva
Bodensee	Lake in Switzerland and Germany	Lake Constance
Venedig	City in Italy	Venice
Bayern	Province in Germany	Bavaria
Böhmen	Province in Austria	Bohemia
Russ or Memel	River in Germany and Russia	Niemen
Byzantium or Stamboul	City in European Turkey	Constantinople
Livorno	City in Italy	Leghorn
Firenze	City in Italy	Florence
Cervin	Mountain in Swiss Alps	Matterhorn
Albania	Newly-constituted independent state north of Greece	
Liechtenstein	Independent principality between Austria and Switzerland	
Warszawa or Varsovie	City in Poland	Warsaw
Ofen Pest	City in Hungary	Buda Pest
Pas de Calais	Channel east of England	Strait of Dover
Petrograd	Capital of Russia	St. Petersburg

THE RUSSIAN CAMPAIGN IN GERMANY AND AUSTRIA.

By Lawrence Martin
University of Wisconsin

Geographical Features

THE Russian campaign against Germany and Austria has been carried on in a great plain between mountains and the sea.* The situation is similar to that in the war in western Europe, where the armies faced each other in October and November, 1914, along a continuous northwest-southeast line, 350 miles in length, from the Jura Mountains in Switzerland to the English Channel. In the eastern campaign the general direction of the sinuous line is more nearly north and south. In this case it will be recalled that the Carpathian Mountains (Fig. 1) are about 350 miles from the Baltic Sea and the line of campaign stretches across the plain in the states of (a) Austrian *Galicia,* (b) Russian *Poland,* and (c) German *East Prussia,* which are about as large as the states of South Carolina, New York, and Maryland plus Delaware, respectively. Little of the plain is as much as 700-1,000 feet above sea level. East Prussia contains a great ridge and is drained by the *Niemen* or Russ or Memel River and the smaller Pregel and Passarge Rivers which flow north to the Baltic. The master stream in the plain of Poland is the *Vistula* or Weichsel, whose three chief tributaries are (a) the Narev from the north, (b) the Bug from the east and southeast, and (c) the San from the south. In western Poland is the small River *Warta,* a tributary of the Oder. The Bug and San rise in Galicia, but most of the province drains southeastward to the Black Sea by the *Dniester.* The Carpathian foreland in Galicia is similar to the Swiss Plateau north of the Alps. Part of it is called the Podolian Plateau. The plain between the Carpathians and the Baltic contains much forest and many large swamps. The rivers have severe spring floods. North of the Podolian Plateau and east of the Bug River is the basin of the Pripet, a tributary of the Dnieper River. In its headwater region, just east of Poland, is the Pinsk Marsh, an area of morasses, trembling forests, and swamps, now partly

* The best English accounts of the geographical features of the field of the Russian campaign are to be found in Lyde's new book on *The Continent of Europe;* in Partsch's *Central Europe;* in Penck's *Carpathian Lands,* Aitoff's *Russian Empire,* and Kirchoff's *German Empire,* all in Mill's International Geography; and the standard works of Reclus in *The Earth and Its Inhabitants* and Chisholm in *Stanford's Compendium of Geography and Travel.* Davis has briefly described the haffs of the Baltic Coast, near Danzig and Königsberg in East Prussia, and the valleys of the Rivers Vistula and Netze, near Bromberg west of Thorn, in a paper on *Large Scale Maps as Geographical Illustrations,* (Journal of Geology, Vol. IV, 1896, pp. 484-513), where he refers to the detailed maps. Among the good general maps for following the campaign are those in the large encyclopedias and atlases, and those in the inexpensive small atlases such as Sydow-Wagner's *Methodischer Schul-Atlas,* Bartholomew's *Comparative Atlas,* and Stanford's *Handy Atlas of Modern Geography.* Sheet XL in Romer's *Atlas Geograficzny* covers the whole eastern campaign very well on the scale of 1:5,000,000. The topography is unusually good, but the names are in Polish.

drained. It is 250 miles wide and covers about 35,000 square miles, being nearly as large as the state of Indiana. Because of remoteness from the ocean, the East Prussian ridge, Polish plain, and Carpathian foreland have hot summers and cold winters, a climate less favorable for a winter campaign than that of Belgium, France, and western Germany. The harbors of Riga and

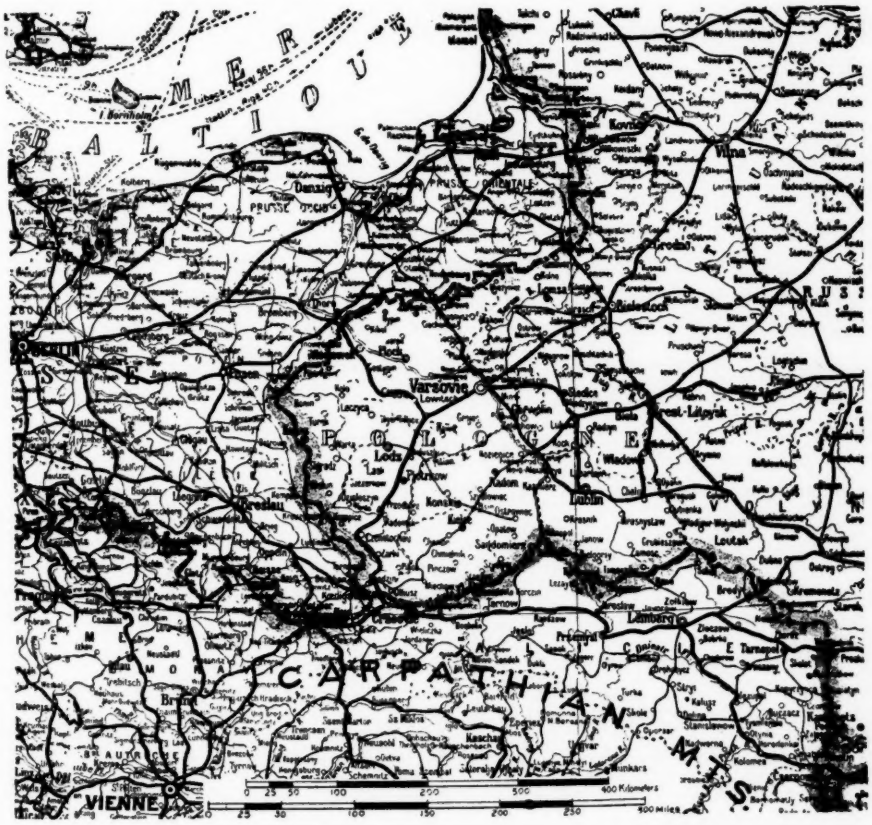

Fig. 1. Map showing field of eastern campaign and its railways. (Modified from a French map issued in August, 1914, by War College Division, General Staff, United States Army). The name of Warsaw appears as *Varsovie*, Cracow as *Cracovie*, Baltic Sea as *Mer Baltique*, Poland as *Pologne*, East Prussia as *Prusse Orientale*.

Memel north of Königsberg are closed by winter ice for over 4 months, that of Danzig for less than three, that at Greifswald north of Berlin and west of Stettin not quite two, while the port of Lübeck east of Kiel is frozen only a little over a month, and Hamburg never has ice. This shows how the severity of the winter increases from west to east.

Russian Advance, Retreat, and Readvance In Prussia.

The international boundary traverses a plain and seems to be determined by no natural geographical features. Consequently it was easy, while Ger-

many was engaged in her unsuccessful lightning campaign against Paris, for the Russians to invade East Prussia where they chose, as soon as Germany declared war on Russia the first day of August. The facts and dates cited in this article were obtained from the New York and Chicago daily papers, from the weekly issues of two American periodicals (the *Nation* and the *Literary Digest*) two German papers (the *Deutsche Tageszeitung* and the *Tägliche Rundschau* of Berlin) and the weekly edition of the London *Times*.

Northeastern Prussia is a lowland with many swamps, but southward near the Russian frontier is the Baltic Ridge, an enormous terminal moraine of the Scandinavian ice sheet with rough topography, hills reaching an altitude of 500 to 1000 feet, and great numbers of lakes. The lake district is called Masuria. The extent to which these topographic features have figured in determining exact routes and affecting battles in the campaign in East Prussia is not apparent from the meagre newspaper dispatches thus far available. The Russian invasion followed three lines, crossing the Prussion frontier on August 16th (a) at Eydtkuhnen (Fig. 2) east of Königsberg, (b) near Lyck, 50 miles to the south, and (c) at Neidenburg, 80 miles farther to the southwest. Northern Germany, east of the Vistula, projects some 160 miles farther into Russia than do the southeastern states of Posen and Silesia, so that this Prussian campaign was evidently aimed at Königsberg and Danzig rather than at Berlin (Fig. 1) which is only 180 miles from the Polish frontier south of Thorn and east of Posen, or about as far as from Chicago to Indianapolis or from New York to Baltimore. This Prussian campaign may have been undertaken in order to divert German troops from the line opposing the Allies in northern France or from the main Russian army in Poland, or to prevent a flanking movement from East Prussia into northeastern Poland, or even in part for moral effect, as has been suggested regarding the French invasion of Alsace-Lorraine. This invasion came about almost exactly as was suggested over 15 years ago by Partsch in his remarkable analysis of the strategic geography of this situation (see "Geographical Conditions of National Defense," printed elsewhere in this magazine).

Gumbinnen, 20 miles inside the Prussian frontier, was reached in 3 or 4 days, then Insterburg and Tilset, and finally points only 17 to 35 miles from Königsberg. Farther to the southwest Bialla, Johannisburg, Ortelsburg and Soldau fell into the hands of the Russians the last week in August, although the Germans had won skirmishes at some of these places earlier in the month and actually held Mlawa, 5 miles inside the Russian frontier, on August 18th. By August 28th the Russians had advanced 50 to 70 miles into Prussia, reaching the dashed line in Fig. 2. The area invested is largely inhabited by Poles, while the region to the north near the Baltic has Germans. There was fighting at Allenstein nearly 60 miles from the boundary. Here the Germans won an important victory, as they did also at Tannenburg in the terminal moraine south of Osterode on August 29th, where the Russians lost many

men. Being reinforced by troops from the French campaign, the Germans drove the Russians back out of Prussia by the middle of September and 50 miles into Russia to Grodno on the River Niemen, along which a week-long battle was fought about the last of September. The only geographical feature which seems to have counted in this part of the campaign is the River Niemen, whose shallow valley was not a strong natural line of defense, and yet along which the Russians checked the German advance toward Vilna and Riga. Subsequently the Russians have readvanced to or past the Prussian frontier winning victories at Suwalki, Drusskeniki and Augustovo, the latter being a great five days battle ending about October 4 (Fig. 2). Lyck, which is 15 miles inside the German frontier, was re-occupied by the Russians on October 7th. Gumbinnen, Johannisburg, Soldau, Goldap, and Augerburg were taken by the Russians during the second and third weeks in November, the latter being 37 miles inside the German frontier. The tangle of glacial lakes in Masuria seems to favor the German defense, except when covered with winter ice. The 50 miles from Augerburg southwest to Johannisburg, for example, are without a place to cross, except at Lötzen where the narrow road between two crooked lakes is defended by a strong German fortress.

The absence of attack upon Königsberg, Memel, and Danzig by the Russian navy seems to be due partly to the geographical feature of shallow water in the haffs (lagoons) behind the nehrungs (sandbars with dunes) on the Baltic coast, but chiefly to the mines in the entrances to these three harbors and to the ease with which ships from the German fleet could proceed eastward from Kiel to the defense of these ports. It is not known whether the larger part of the Russian fleet is at Libau, which is 120 miles northeast of Königsberg and only 40 miles from the German frontier near Memel, or at Kronstadt near Petrograd, or at Helsingfors in Finland. It seems probable that it is not at Libau, where a small fleet of German vessels bombarded the town on August 8th and November 17th, attempting to blockade the port by sinking merchant vessels.

Austrian Defeat In Galicia and Poland

The second part of the eastern campaign has been fought out in Galicia and southeastern Poland, taking place at the same time as the fighting in East Prussia. Most of Galicia east of the San is inhabited by Russians. Austria north of the Carpathians is wide open to Russian invasion. The Podolian Plateau which is partly in Galicia and partly in Russia, has a 600 foot escarpment on the Russian side near the Bug and Dnieper Rivers, but the frontier has no topographic aid to defense. Less than a quarter of Galicia is forested. The Carpathian foreland has a height of 800 to 1500 feet so that the tributaries of the Dniester and the San have cut valleys 200 to 500 feet in depth and these seem to have guided the lines of invasion to some extent. By August 10th the Austrians had 3 army corps in the field east of Lemberg.

A corps consists of 30,000 to 50,000 men. The first skirmish occurred at Zalotche the next day, the Russians having invaded Austrian territory with the vanguard of the 6 corps which faced them. During the first week in September the Russians captured the fortified capital city, Lemberg, about 60 miles inside the Austrian frontier. They then besieged and isolated the great fortress of Przemysl, 55 miles farther west.

Early in August the Austrians had invaded southeastern Poland; and on August 21st they had 2 army corps north of Kielce, over 40 miles inside the Russian border, while 7 corps had crossed the River San and were heading toward Lublin. They were less than 90 miles southwest of the great Russian concentration camp at Brest-Litefsk on the Bug River. They seem to have turned the Russians back near Krasnik, east of the San, in two battles during the last week in August. However, the Russians soon had a million and a half troops to face the Austrian million. They met along a line of battle 150 to 200 miles in length and the Austrians had to yield, but not without a stubborn series of fights. The Russians eventually drove the Austrians westward 60 or 70 miles over the Galician and Polish battlefields of Grodek, Rawaruska, Tomaszow, Lublin, and Ivangorod to the line of the Rivers San and Vistula, always apparently with the river valleys as temporarily effective factors. The valley of the San is 350 to 1000 feet in depth in some places. The swamps of the Galician and Polish Plains seem to have aided the Russians in the decimation of the Austrian army corps.

Halicz and Miklaiow, southeast of Lemberg were captured by the Russains by the middle of September and Jaroslaw and Chyrow near Przemysl before the end of the month. Although the great topographic barrier of the Carpathian mountain wall has protected Hungary from invasion, the passes have been entered by victorious Russians, who penetrated as far as Uzsok the latter part of September. Parties of Cossacks went 40 miles into Hungary to Ungvar. The hesitation along the San during October seems to mark only the reinforcement of the Austrian line by the Germans rather than any permanent turn in the tide. On October 29th the Russians were advancing west of the San, and if Przemysl falls they will doubtless move westward on Cracow, if indeed it does not surrender sooner, leaving an Austrian force trapped between the Russian army and the high Carpathians, with their snow-filled passes. Tarnow, which is less than 50 miles east of Cracow, was in the hands of the Russians between September 25th and the 1st of October, but was lost again, and then reoccupied on November 14th. Austria has been under the disadvantage of having two army corps in the western campaign in France for a time and a large force facing the Servians in Bosnia and Servia, as well as suffering from disease, the Asiatic cholera having broken out among the troops in Galicia about the middle of October.

Bukovina is an Austrian province southeast of Galicia and similar in topography. Nearly half its area is in forest. It is about half as large as

Massachusetts. No strong force has been sent against this unimportant province. Czernowitz, the capital, is reported as won and lost and won again by the Russians; and early in October a party of Russians had crossed the Carpathians and were at Rodna Pass in Transylvania. Bukovina is separated from Austria-Hungary by the great rampart of the Carpathians and inhabited wholly by peoples of Russian and Roumanian blood.

German Advances and Retreats In Poland

Between Galicia and East Prussia lies Poland, a low, rolling plain with its flat-lying young rocks almost completely covered by glacial deposits. It stands 250 to 700 feet above sea level, Lysa Gora, a small upland area near Kielce reaching 2000 feet. About one-fifth of Poland is forest. Its predominantly Polish population has certainly not been anti-Russian in sympathy during the campaign. Here the first months of the war were without notable activity. The undefended city of Lodz, 60 miles east of the German frontier and 90 miles north of Cracow was occupied by a German force early in September. The Germans invaded Poland in larger numbers the last week in September but were defeated at Kalisz on the frontier. Russian forces threatened Breslau 3 times during September, without success.

Considerably later the Germans entered Poland in force between Thorn, Kalisz and Cracow, rapidly penetrating 125 miles to the east of their frontier and driving the Russians back to Blonie and Senkocin. Here the Germans were within 8 to 14 miles of Warsaw, which was in serious danger of capture the second week in October. They seem to have held all Poland west of the Vistula at one time but never to have been able to cross the shallow valley of the Vistula, whose volume is such that it tends to be effective as a geographic barrier. From this position the Russians forced the Germans back, first outflanking them with cavalry from the fortress of Novo-Georgiewsk, northwest of Warsaw where the Bug enters the Vistula, so that the first week in November (Fig. 2) saw them driven more than 60 miles to the southwest, with difficult marshy country through which to retreat. The natural line on which they halted is that of the River Warta or Widawka. Along this river, 100 to 120 miles from Warsaw and only 10 to 40 miles from the German boundary, engagements took place the 7th of November near Kolo, Warta, and Sieradz, as well as to the south near Czentochau. The next day the Russians crossed the German boundary to Pleschen, near Kalisz and 50 miles southeast of Posen. On November 9th the Germans were making a stand between the Warta and their frontier.

North of the Vistula near Plock, however, they were still within 70 miles of Warsaw, having reinforced their line with troops from Thorn and East Prussia, checking the Russian advance and driving them back after they had penetrated past Lipno (Fig. 2). On November 20th the Germans were again advancing near Novo-Radomsk, Kutno and Leczyca, though the last week in November saw the German army defeated near Lodz and split into 3 dangerously isolated forces between the Vistula and the Warta.

Fig. 2. Map showing approximate position of Russian, German, and Austrian forces at varied dates, the lines drawn in each case representing farthest advance of invading force at the time specified. Between Nov. 16th and 20th the Germans readvanced along the Vistula, driving the Russians back near Lipno and Kutno, but suffering what seems to be a disastrous defeat near Lodz the last week in November.

At the end of 3 months of fighting the whole eastern campaign has involved (a) Russian advance, retreat, and readvance in morainic East Prussia, (b) a thorough defeat for Austria in hilly central Galicia, (c) Austrian advance and retreat in swampy southeastern Poland, and (d) German

advance, retreat, and advance in the plain of southwest Poland. Russia has made no notable progress toward Berlin, which has no hilly country between, as Cracow has, and no mountain barrier as in the case of Vienna. It is highly creditable to Germany that her armies still spread out beyond both her eastern and western frontiers after three and one-half months of fighting, a period half as long as that of the whole Franco-Prussian war. On the other hand Russia has repulsed strong German forces near the Niemen and before Warsaw. She has reduced Austria to the position of a burden upon rather than an aid to Germany, and has demonstrated that her forces can advance effectively in the sort of topographic situations that separate her from the German capital, although the plain of eastern Germany could never be crossed with ease by an invading force. The lines of the rivers Vistula and Oder in Germany contain strong topographic positions for defense, though not as strong as those of the low mountains between Berlin, the Rhine, and France.

It does not seem probable that the entering of Turkey into the fray as an ally of Germany and Austria will complicate the campaign in eastern Germany. A more formidable enemy of both sides is the coming winter.

PETROLEUM AND THE WAR.

The Russian oil wells in the Caspian-Black Sea district are of importance in the present war, with the large use of gasoline for aeroplanes, automobiles, and trucks used in transporting food for the armies and in moving field artillery. There are oil wells in Galicia which Russia has captured from Austria-Hungary. In 1912 Russia ranked next to United States in petroleum production, Roumania being fourth and Galicia sixth. Germany has little petroleum, but she has a great quantity of potatoes, and probably an excess of sugar, and Hungary has much corn. As alcohol can be made from all three of these, there seemingly need be no shortage of fuel for internal-combustion engines in Germany, provided they are equipped to substitute alcohol for gasoline.

KIAU-CHAU.

Germany's only Asiatic possession is situated west of Korea. It is 350 miles north of Shanghai and about the same distance southeast of Peking, China, on the southern side of the Shantung Peninsula. This peninsula was formerly an island, being tied to the mainland by the delta of the Hoang Ho or Yellow River. On the northern side of the Shantung Peninsula is the British port of Weihaiwei. Tsing-Tau, the chief city of Kiau-Chau surrendered November 5th, after an eleven weeks' siege by the Japanese and British.

Graf von Pfeil describes Kiau-Chau in *Mill's International Geography*

as follows: "Kiau-chau is a large bay of 180 square miles area on the southern coast of the peninsula of Shantung. It takes its name from the "Glue city", 22 miles north of it. The Kiau river coming from the mountains in the eastern portion of Shantung brings down much sand, which causes the bay to silt up. The entrance of the bay, between two narrow spits of land, is about two miles wide and 20 fathoms deep. The landspits, together with the islands in the bay, are leased by Germany from China, while the German sphere of interest extends all round the bay for a distance of 31 miles. The climate is excellent, and quite that of the temperate zone; ice occurs in winter, but as it hardly ever covers the bay it does not form such an impediment to navigation as the fogs which are frequent on the coast further south, from which Kiau-chau is perfectly free. The greatest rainfall occurs in July and August. The inhabitants are agriculturists who have carried a system of irrigation to great perfection. The tidiness of their settlements is a mark of their prosperity. Kiau-chau is expected to prove valuable as an outlet for the great mineral wealth of Shantung."

The *Stateman's Yearbook* for 1914 gives this additional information: "Kiau-Chau, on the east coast of the Chinese province of Shan-tung, was seized by Germany in November, 1897; the town, harbour, and district were by treaty transferred to Germany on a 99 years' lease, March 6, 1898; and the district was declared a Protectorate of the German Empire, April 27, 1898. The administration is entrusted to the navy department, and a naval officer is governor.

Area, about 200 square miles, exclusive of the bay. There are 33 townships, and a population of about 192,000; white population with the garrison, 1913, 4,470 (Germans, 3,806). Surrounding the district and bay is a neutral zone, its area being about 2,500 square miles, and population about 1,200,000. There are 50 German schools for Chinese, mostly taught by missionaries. At Tsing-Tau there is a school for European children with 140 and a higher-class school with 145 pupils. For the year 1914 the sum required for administrative expenses was 16,787,625 marks (about $4,197,000). (Imperial subvention, 9,560,000 marks, $2,390,000). The garrison (3,125 men) consists of German marines, with a small force of Chinese soldiers.

The products are fruits, beans, ground-nuts, sweet potatoes, etc., and silk culture, coal mining, briquette-making, brewing, soap-making are carried on, and there is a prosperous silk factory. Over 1,000 Chinese are employed on the floating dock. At Kiau-Chau in 1911 the imports amounted to 114,938,000 marks ($28,734,500) and the exports to 80,295,000 marks ($20,073,000). The chief imports were raw cotton, cotton goods, and cotton yarn, metals, paper, sugar, and matches. The chief exports were straw braid, silk, ground nut and bean oil, and Shantung pongees. In 1911, 614 vessels of 1,070,000 tons entered at Kiau-Chau. 6,014 junks entered, and 5,550 cleared. A railway, Tsing-Tau to Poshan=272 miles."

ECONOMIC RESOURCES OF THE UNITED STATES.

THE peculiarly fortunate position of the United States in its ability to supply its own needs is clearly seen from a survey of its production and relative contributions to the world of the three great requirements of man—food, clothing and shelter.

It is found, for example, that the people of the United States may be fed readily by home-produced foodstuffs, the vast area of 3 2/3 million square miles representing every variety of climate and production and being nearly equal in extent to all Europe, which has a population five times that of this country. Agriculture in the United States has not yet reached the stage of scientific development common to many countries of Europe, and present domestic production may therefore be expected to increase greatly with more attention to improved methods of culture. Nevertheless, the United States already produces over 2,500 million bushels of corn, or two-thirds of the world supply. This year's wheat crop is estimated at the high record figure of 911 million bushels, about 20 per cent of the world harvest. The United States also produces annually over 1,000 million bushels of oats, or one-fourth of the international yield, and 197 million gallons of cottonseed oil, representing most of the annual output of this article whose food value as a substitute for olive oil is becoming more and more recognized.

Fifteen per cent of the world's cattle are on United States farms, the number in this country being 59 million, or twice as many as in Argentina or European Russia and half the number in India. This country also has 60 million swine, 50 million sheep and 24 million horses; it imports, however, 5,000 million pounds of sugar (chiefly Cuban), or 1½ times the amount produced in continental United States and its island territories.

In clothing material the United States is also favored, producing annually over 14 million bales of cotton, representing over one-half of the world's supply. Of wool, it produces 300 million pounds a year, the home requirements being supplemented by 238 million pounds of foreign wool and 34 million dollars' worth of woolen goods.

In the mineral kingdom, the pre-eminent position of the United States is unquestioned.* The country produces, for example, 534 million short tons of coal, 40 per cent of the world's output; 238 million barrels of petroleum, two-thirds of the world's total, and 57 million tons of iron ore, out of a world total of 132 million. One-half of the world's copper is taken from mines in the United States, which turned out 1½ million pounds in 1912. Of the world's output of 466 million dollars' worth of gold, the United States produced about 20 per cent, being exceeded only by South Africa. About 28 per cent of the world's silver and 30 per cent of its lead are produced in this country.

In the value of manufactures the United States leads the world, though

* See Journal of Geography for November, pp. 72-73.

the product of its factories is chiefly consumed at home. Of the 20,700 million dollars' worth of manufactures produced in the United States in 1909, only about five per cent was sold to foreign countries; the world market for iron and steel products, cotton goods, chemicals and other important products of industry being thus far largely held by England, Germany and other European nations.

	United States	Approximate share in world's total
Area	3,600,000 square miles	7 per cent
Population	102,000,000	6 " "
Corn product	2,600,000,000 bushels	68 " "
Wheat product	911,000,000 "	20 " "
Cotton product	14,000,000 bales	61 " "
Sugar product	3,577,000,000 pounds	10 " "
Tobacco product	791,000,000 "	35 " "
Number of cattle on farms	59,000,000	15 " "
Coal product	534,000,000 tons	40 " "
Petroleum product	238,000,000 barrels	63 " "
Copper product	1,243,000,000 pounds	55 " "
Iron ore	57,000,000 tons	42 " "
Gold product	$93,000,000	20 " "
Stock of gold	$1,880,000,000	22 " "
Value of all farm products	$9,751,000,000	No data
Value of manufactures	$20,672,000,000	No data
Imports in fiscal year 1914	$1,894,000,000	9 per cent
Exports in fiscal year 1914	$2,365,000,000	12 " "
Foreign trade in fiscal year 1914	$4,259,000,000	10 " "
Domestic trade in fiscal year 1914	$40,000,000,000	No data
Railways	259,000 miles	38 per cent
Aggregate wealth, estimated	$140,000,000,000	No data

[From *Commercial America,* Vol. XI, p. 13, Oct. 1914.]

HENRY GANNETT.

Henry Gannett died in Washington on November 5th from a complication of diseases after an illness of about a year. He was one of the leading American authorities in cartographic, statistical, and applied geography. He was 68 years old. As geographer of the United States Geological Survey for over 40 years, chairman of the United States Geographic Board, geographer of the 10th, 11th, and 12th censuses, and president of the National Geographic Society, his loss is a serious one. He published the best topographic map and the best rainfall map of this country, four books dealing with statistical geography, commercial geography, geography of the United States, and topographic methods, as well as statistical atlases of three federal census reports, census reports of three of our outlying possessions, lists of topographic maps showing the principal physiographic features, and more than 20 books dealing with altitudes, areas, boundaries, origin of place names, conservation, forests, magnetic declination, profiles of rivers, and geographic dictionaries of a dozen different states. Besides being extraordinarily competent in statistical and editorial work he was also a physiographer of ability, writing papers dealing with glacial erosion, climatic control of timber lines, etc. He

was chairman of the Research Committee of the National Geographic Society, and did much to make effective their scientific explorations in Alaska, South America, and elsewhere. Under his presidency the membership in the National Geographic Society has reached nearly a third of a million.

CURRENT GEOGRAPHICAL NOTES.

THE WEATHER AND CLIMATE OF CHICAGO. By Henry J. Cox and J. H. Armington. Bulletin No. 4, The Geographic Society of Chicago. University of Chicago Press, Chicago, Ill., 1914, xxv and 396 pages, pls. and figs. Price $3.00.

The progress of American climatology on a sound scientific basis has been much retarded by the lack of such complete detailed studies of climate as are available, in considerable numbers, for other countries. We need more of such monographs as that of Professor Oliver L. Fassig, on the climate and weather of Baltimore (1907). We need more of such detailed discussions of single climatic elements as that of Professor Alexander G. McAdie, on the rainfall of California (1914). We are gaining each year, but our progress has been lamentably slow. A thorough investigation of weather and climate, whether it be local, as in the case of a single city; or more general, as in the case of a larger district, or of the whole country, is therefore particularly welcome to those who are sincerely interested in the advance of American climatology, and who care about the position which our own contributions to this subdivision of the larger science of meteorology occupy in the world.

Professor H. J. Cox and Mr. J. H. Armington, of the local office of the Weather Bureau in Chicago, have done an excellent piece of work in preparing their monograph on the weather and climate of Chicago, and the Geographic Society of Chicago is to be congratulated on its publication as *Bulletin No.* 4 of that Society. We have, in this volume, a very complete presentation of all the generally recognized "standard" climatic data of Chicago, based (chiefly) upon the records from 1871 to date. And the essential results are shown in a large number of diagrams, many of which we believe might well be enlarged, by photography, for use in the schools of the city. There are several more or less "popular" aspects of Chicago's climate the discussion of which will be the first thing sought by most persons who take up this volume. Chicago, e. g., is well known as "the windy city," and the wind data will therefore be of particular interest to many readers. The presentation of these records is very complete, the author remarking (p. xxiv) "there is some reason for the sobriquet, although the wind movement here is not much greater than it is at other places in the Great Lakes region." Another feature of local interest is the effect of Lake Michigan, whose cooling influence in "breaking up" summer hot waves, and whose warming influence (when not extensively frozen) during winter cold waves is noted. In an appendix there is both a tabular and a graphic summary of

the weather on certain holidays (New Year's, Fourth of July, Christmas), based on the records for 1872-1913, which will naturally be of considerable local interest, although, of course, no one should use such summaries as forecasts for any particular year. The Chicago fire of 1871, it may be noted in passing, occurred at the end of a long period of drought, which finds its place in the list of "Dry Spells of Two Weeks or Longer" (pp. 194-196). There is commendable emphasis upon the correlation between wind direction and temperature and between the state of the sky and temperature, including curves to illustrate these important features, e. g., Figs. 29, 30, 58. We note, also, an interesting chart (Fig. 50) showing the snowfall during a "freak" snowstorm on Nov. 26, 1903, in which 14 inches of snow fell in South Chicago, near the lake, and practically none at all fell west of Halsted St. We are especially glad to see the discussion of weather types, and the numerous copies of barograph and thermograph curves, as, e. g., the examples of cold wave (Fig. 73), warm days (Fig. 74), lake influence during a hot wave (Fig. 26), etc. We call attention, in passing, to the fact that the chart showing the average annual snowfall for the United States (Fig. 48) has been superseded by a new map prepared by Charles F. Brooks and published in the *Quarterly Journal of the Royal Meteorological Society*, Vol. 39, 1913.

It is rather superfluous for the reviewer to suggest any additions to a discussion which is already so remarkably complete, but for our own part we wish very much that the authors had paid a good deal more attention to the weather, or cyclonic element; that they had laid more emphasis on the human relations; that they had made the whole picture of Chicago weather and climate more vivid, more interesting, more vital; that, in their consideration of special conditions, as droughts, or excessive rains, etc., they had taken account of the *causes* of those particular "spells," as illustrated by the daily weather maps. However, these may be the opinions of the reviewer alone, who heartily welcomes this new volume as a worthy contribution to American climatology.

R. DeC. WARD.

THE COPPER MINES OF NORTHERN MICHIGAN

THE mining of copper in Michigan antedates the earliest visits of European explorers to the region. The production on a commercial basis, however, dates from 1845, since which time the district has been a steady producer and an important factor in the copper industry of the world. To the close of 1913 Michigan has produced 5361 million pounds of copper, or 28 per cent of the output from the United States since 1845. For many years subsequent to 1845 Michigan was the most important copper-producing state and in total output it is second only to Montana. The entire output is from the Keweenaw Peninsula.

In the value of metal output, in the profits resulting from this output,

in the development of mining and metallurgical processes, and in the general high standing of the companies conducting the operations, the district takes high rank among the great mining camps of the world. Previous to the perfection of the electrolytic process of refining, "Lake" copper enjoyed the distinction of being the highest grade produced, and even to the present time it sells at a figure slightly higher than the copper from other districts.

Although the district has been an active producer for 65 years, most of the older mines still have large reserves of ore and new mines are being opened, while much territory remains to be prospected. Moreover, it is claimed that a large tonnage of the mill tailings produced when milling methods were less efficient than at present can be re-treated at a profit.

Perhaps the most important developments of the last few years are those in the southern part of the district, where the Lake mine and neighboring properties have disclosed what may prove to be large bodies of ore in a section of the district that hitherto has been less promising than the more fully developed area to the north.

The Lake Superior region is unique in being the only district from which a large output is derived from native copper. The rocks of the district comprise a thick series of lava flows and beds of conglomerate and sandstone of pre-Cambrian age. The copper occurs in the cellular portion of the lava flow, and as a cement and to some extent a replacement of the conglomerate pebbles forming the conglomerate. The native copper occurs in the lodes in masses varying from microscopic size to bodies weighing hundreds of tons. The richest lode mined at present carries but 1.5 per cent copper, and the poorest rock treated yields but little above five-tenths of 1 per cent of metal. For this low-grade ore to be profitable it must be handled on a large scale; this has resulted in the construction of the immense plants that characterize the Lake district. The lodes are worked for the most part through inclined shafts, though some of the deeper deposits are opened by vertical shafts. The workings have been extended in some cases to a mile in vertical depth, or about a mile and a half down the lode. Pillars of rock are left to keep the lodes open, and dry walls constructed from the waste sorted underground serve the same purpose in some of the mines. Much timber, however, is required in some of the mines, especially those operating on the conglomerate lodes.

The rock coming from the mines is crushed by steam stamps and concentrated, producing "mineral" containing an average of about 65 per cent copper.

The district is well located for cheap working of the mines. The Great Lakes furnish cheap transportation for both coal and copper, the Lake transportation being brought into the heart of the district by Portage Lake and the Houghton ship canal. The district is served by the Mineral Range, Copper Range, and Keweenaw Central Railroads, and is connected with the main

lines of traffic by the Chicago, Milwaukee & St. Paul and the Duluth, South Shore & Atlantic railways.—[*Mineral Resources of the United States,*]

B. S. BUTLER.

ECUADOR'S CACAO CROP

Ecuador's cacao crop continues to increase. The value of the cacao for the period of 1913 was $2,650,602, and of 1914, $4,819,277. If these figures are an indication of the total year's exports of cacao from Guayaquil, they promise to reach 100,000,000 pounds. The export duties collected during the 1914 period aggregated more than $1,200,000.

Some idea of the magnitude of the cacao crop may be gained from the fact that the main streets of this city are almost wholly occupied by cacao beans, placed there to undergo the necessary curing process, and the wharves are covered to a height of several feet with the beans in bags ready for export. The enormous yield is the result of the increased acreage and greater number of trees planted in the last few years. This policy is being continued year after year, so that soon the cacao crop of Ecuador will far surpass present figures. So long as the cacao crop continues to be so bounteous, the Republic will occupy an independent financial position.

AMERICAN OIL DRILLERS IN CHINA

During early June, 1914, 19 expert oil-well drillers, of the Standard Oil Co., left Shanghai for Shensi Province in Northern China to make a practical investigation of oil possibilities. They are to proceed via Hankow, on the Yangtze River, thence to Honanfu on the railroad line between Hankow and Peking. From that point 40 days will be occupied in reaching the oil fields.

On the initial trip the party conveys 250 to 300 tons of American oil-drilling machinery, including cable tools for drilling. There are four outfits of this kind, besides two additional outfits of rotary machinery for soft formation work. This caravan is utilizing 300 Chinese carts and, as 40 days are required to reach the oil fields from the railway at Honanfu and an equal number of days in returning, 80 days will be occupied in taking each separate oil-drilling outfit into the interior.

It is anticipated, however, that only a short time will be required by the American experts to demonstrate the oil prospects in Northern China. The machinery sent in is capable of drilling a well 3,000 to 4,000 feet deep. At present some oil wells in the Shensi Province have been drilled 350 feet by Japanese. The American drilling follows an investigation by American geologists.

All the provisions and supplies for this extensive preliminary work are from the United States. The machinery was landed at Taku, near Tientsin, and from there transported by rail to Honanfu.

The commercial interests of China, generally, are deeply interested in the outcome of the Standard Oil investigations. The importation of kerosene into China for 1913 totaled 183,984,052 gallons, valued at $18,823,508 gold.

Tree Planting in the Philippines

A tree planting scheme for the Philippine Islands has recently been inaugurated by the consular Bureau of Forestry cooperating with the Bureau of Education. For several years the Forest School at Los Banos has been experimenting with tree planting. Out of several hundred tree species experimented with, six species have been found to thrive under adverse conditions, and to produce wood of value in the market. The species chosen, Teak, Molave, Narra, Lumbang, Lamutan, and Tuai, produce the strongest of woods for construction, and some of the most beautiful as cabinet woods.

The Bureau of Education has hundreds of school gardens and farms, and will plant the seeds and seedlings supplied by the Bureau of Forestry, and the nurserymen and rangers of the Forestry Bureau will actively cooperate with the schools in the venture. The Bureau of Public Works will also cooperate, planting seeds and seedlings along the highways. There are at present over 4000 miles of first class, rock-surfaced highways in the Islands and new roads are added at a rate of over a mile a day.

This whole movement is one of the largest significance, and well illustrates the wise foresight, and careful planning characteristic of Major Ahearn, chief forester, and Mr. Frank R. Crone, chief of the Bureau of Education.

J. Paul Goode.

Commercial Year of Egypt

As the result of the lowest Nile recorded for a century, some 400,000 acres of productive land remained unwatered. Had it not been for the augmented storage capacity provided through the heightening of the Aswan Dam in 1912, an almost total crop failure would undoubtedly have resulted. The rice crop was most affected and was almost a total failure. The cultivation of other food grains was greatly restricted so that as much as possible of the land supplied with water might be put under cotton. Grain foodstuffs and feed can be replaced by imported products. The depredations of the pink boll worm, Egypt's new cotton parasite, were more marked than during the 1912-13 season. The worm, which houses in the seed, destroys the seed's value, and it is this that causes the damage rather than the effect on the staple, provided, of course, that the worm does not attack the plant too early. Its presence in the seed makes necessary the most scrupulous care in selecting seed for the next season's planting.—[*Daily Consular and Trade Reports.*]

NEWS NOTES.

Professor William Morris Davis returned to the United States early in November, after spending nine months in the study of coral reefs in the South Seas and visiting Australia and New Zealand with the British Association for the Advancement of Science.

Professor Albert Perry Brigham has returned to his work at Colgate

University after spending a year in Europe. In August last, he gave a course of seven lectures before the Oxford University School of Geography upon the subject: Regional Development and Conservation Problems in the United States.

Professor J. Paul Goode of the University of Chicago and Professor Frank McMurry of Teachers College, Columbia University, addressed the sixty-second annual meeting of the Wisconsin Teachers Association in Milwaukee on November 5th and 6th, their respective subjects being "Japan," and "Teaching Pupils How to Study."

Mr. David T. Day has resigned from the United States Geological Survey to enter private practice. He has served the federal bureau for many years. A recent publication of the Geological Survey by Dr. Day is a colored wall map of the United States, 49 by 76 inches, sold for one dollar, and showing the oil and gas fields of the United States, and the principal pipe lines by which oil is transported from Kansas, Illinois, Indiana, Ohio, West Virginia, and Pennsylvania to the Atlantic coast at New York, Philadelphia, and Baltimore, and from Oklahoma and Texas to Sabine Pass and Port Arthur on the Gulf of Mexico northeast of Galveston.

Professor Eugen Oberhummer of the University of Vienna has been appointed visiting Austrian professor to Columbia University, where he will lecture during the second semester of the present year. Dr. Oberhummer lectured in the geography departments at Harvard, Yale, Columbia, Johns Hopkins, Chicago, Wisconsin, and other American universities in 1910.

The Association of American Geographers will hold its eleventh annual meeting at Chicago from December 29th to 31st, 1914, under the presidency of Professor A. P. Brigham.

Notice Regarding the Next Number

The Journal of Geography for January, 1915, will contain a *Supplementary List of Material on Geography which may be obtained Free or at Small Cost.* The list covers 22 printed pages and includes 465 titles. It has been prepared by Miss Mary Josephine Booth, librarian of the Eastern Illinois State Normal School at Charleston, Illinois. Teachers and superintendents desiring extra copies of this number may obtain them at a cost of 15 cents each, or 10 cents each in lots of five or more, by writing to the *Business Manager, Journal of Geography, Madison, Wis.,* before December 10th, and indicating the number of copies they desire. The similar list published in this magazine for January, 1914, is entirely out of print.